Amendments to the Claims:

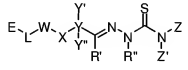
1. (Canceled)

2. (Currently Amended): A composition comprising:

a vaccine in an amount effective to stimulate a cell-mediated immune response; and

a vaccine adjuvant comprising a thiosemicarbazone or a derivative thereof, in an amount effective to potentiate the cell-mediated immune response to the vaccine,

wherein the thiosemicarbazone is a compound of formula I:



I

wherein:

E is absent or selected from the group consisting of alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, heterocyclyl, substituted heterocyclyl, heteroaryl, and substituted heteroaryl;

L is absent or is selected from the group consisting of oxo, amino, alkylene, substituted alkylene, alkoxy, alkylamino, aminoalkyl, heterocyclyl, carbocyclyl, and carbonyl;

W is absent or selected from the group consisting of cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, heterocyclyl, substituted heterocyclyl, heteroaryl, and substituted heteroaryl;

X is a absent or is selected from the group consisting of oxo, amino, alkylene, substituted alkylene, alkoxy, alkylamino, aminoalkyl, heterocyclyl, carbocyclyl, and carbonyl;

Y is selected from the group consisting of cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, heterocyclyl, substituted heterocyclyl, heteroaryl, and substituted heteroaryl;

Y' is absent or is selected from the group consisting of F, Cl, Br, I, nitro, alkyl, substituted alkyl, heterocyclyl, substituted heterocyclyl, amino, alkylamino, and dialkylamino;

Y" is absent or is selected from the group consisting of F, Cl, Br, I, nitro, alkyl, substituted alkyl, heterocyclyl, substituted heterocyclyl, amino, alkylamino, and dialkylamino;

R' is H, alkyl, or substituted alkyl;

R" is H, or

R' and R" are taken together to form a ~~heterocyclic~~ heterocyclic ring;

Z and Z' are independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, aryl, substituted aryl, arylalkyl, substituted arylalkyl, heteroaryl, substituted heteroaryl, heteroarylalkyl, substituted heteroarylalkyl, alkoxy, substituted alkoxy, aminocarbonyl, alkoxycarbonyl, carboxyl sulfonyl, methanesulfonyl, and substituted or unsubstituted alkylcarbonyl, arylcarbonyl, aralkylcarbonyl, heteroarylcarbonyl, heteroaralkylcarbonyl, alkylcarbonyloxy, arylcarbonyloxy, aralkylcarbonyloxy, heteroarylcarbonyloxy, heteroaralkylcarbonyloxy, alkylaminocarbonyloxy, arylaminocarbonyloxy, formyl, loweralkylcarbonyl, loweralkoxycarbonyl, aminocarbonyl, aminoaryl, alkylsulfonyl, sulfonamido, aminoalkoxy, alkylamino, heteroarylamino, alkylcarbonylamino, alkylaminocarbonylamino, arylaminocarbonylamino, aralkylcarbonylamino, heteroarylcarbonylamino, arylcarbonylamino, cycloamidino, cycloalkyl, cycloimido, arylsulfonyl and arylsulfonamido; or

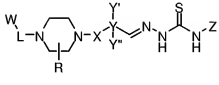
Z and Z' are taken together to form a heterocyclic group, which may be optionally substituted;

the tautomers and the pharmaceutically acceptable salts, esters, or prodrugs thereof.

3. (Original) The composition of claim 2 wherein R' is H.

4-74. (Canceled)

75. (Previously Presented) The composition of claim 2 wherein the thiosemicarbazone is a compound of formula III,



III

wherein:

W is selected from the group consisting of substituted or unsubstituted alkyl, substituted or unsubstituted cycloalkyl, substituted or unsubstituted aryl, substituted or unsubstituted heterocyclyl, and substituted or unsubstituted heteroaryl groups;

X and L are each independently absent or independently selected from the group consisting of lower alkyl and carbonyl;

R is absent or selected from the group consisting of carbonyl, amino, alkyl, substituted alkyl, alkylamino, and dialkylamino;

Y is an aryl or heteroaryl group;

Y' is absent or selected from the group consisting of F, Cl, Br, I, alkyl, substituted alkyl, heterocyclyl, amino, alkylamino, dialkylamino, and nitro;

Y" is absent or selected from the group consisting of F, Cl, Br, I, alkyl, substituted alkyl, heterocyclyl, amino, alkylamino, dialkylamino, and nitro;

Z is hydrogen, or if Y is furanyl, then Z may be selected from the group consisting of alkyl, substituted alkyl, heterocyclyl, amino, alkylamino, dialkylamino, and nitro; and

salts, prodrugs, or tautomers thereof.

76. (Previously Presented) The composition of claim 75 wherein W is an optionally substituted phenyl.

77. (Previously Presented) The composition of claim 75 wherein W is substituted with at least one member selected from the group consisting of Br, Cl, F, and CF_3.

78. (Currently Amended) The composition of claim 75 wherein Y is selected from the group consisting of phenyl, furanyl, ~~pyridinyl~~ pyridinyl, pyrrolyl, pyrazolyl, pyrazinyl, thiazolyl, imidazolyl and pyrimidinyl.

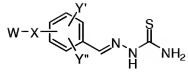
79. (Previously Presented) The composition of claim 78 wherein Y is phenyl, furanyl, or pyrimidinyl.

80. (Previously Presented) The composition of claim 75 wherein Z is hydrogen.

81. (Previously Presented) The composition of claim 75 wherein Y' is F or nitro.

82. (Previously Presented) The composition of claim 75 wherein W is phenyl optionally substituted with $-CF_3$ or Cl; Y is phenyl; Y' is F or nitro; and Z is H.

83. (Previously Presented) The composition of claim 2 wherein the thiosemicarbazone is a compound of formula IV,



IV

wherein:

W is an optionally substituted phenyl or pyridinyl group;

X is alkoxy or alkylamino;

Y' is H or fluoro;

Y" is dialkylamino, fluoro, or nitro; and

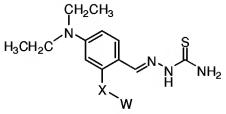
salts, prodrugs, or tautomers thereof.

84. (Previously Presented) The composition of claim 83 wherein W is an optionally substituted phenyl.

85. (Previously Presented) The composition of claim 83 wherein W is an optionally substituted pyridinyl group.

86. (Previously Presented) The composition of claim 83 wherein W is substituted with at least one member selected from the group consisting of -Cl; -F; -Br; $-CF_3$; $-OCH_3$; $-NO_2$; $-CH_3$; $-N(CH_3)_2$; and $-OCF_3$.

87. (Previously Presented) The composition of claim 83 wherein the thiosemicarbazone is



IVa

wherein:

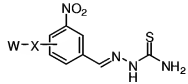
W is phenyl substituted with at least one member selected from the group consisting of -Cl; -F; -Br; $-CF_3$; $-OCH_3$; $-NO_2$; $-CH_3$; $-N(CH_3)_2$; and $-OCF_3$;

X is alkoxy; and

salts, prodrugs, or tautomers thereof.

88. (Previously Presented) The composition of claim 87 wherein X is -OCH_2-.

89. (Previously Presented) The composition of claim 87 wherein the compound is



IVb

wherein:

W is pyridinyl or is phenyl substituted with at least one member selected from the group consisting of Cl, F, and CF_3;

X is alkylamino; and

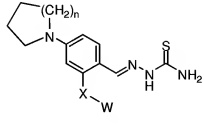
salts, prodrugs, or tautomers thereof.

90. (Previously Presented) The composition of claim 89 wherein X is –$NHCH_2CH_2$- or –$NHCH_2$-.

91. (Previously Presented) The composition of claim 89 wherein W is pyridinyl.

92. (Previously Presented) The composition of claim 89 wherein W is phenyl substituted with Cl, F, and CF_3.

93. (Previously Presented) The composition of claim 2 wherein the thiosemicarbazone is a compound of Formula IVc



IVc

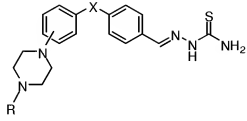
wherein:

W is phenyl substituted with at least one member selected from the group consisting of -Cl; -F; -Br; $-CF_3$; $-OCH_3$; $-NO_2$; $-CH_3$; $N(CH_3)_2$; and $-OCF_3$;

X is alkoxy; and

n is an integer from 1 to 3.

94. (Previously Presented) The composition of claim 2 wherein the thiosemicarbazone is a compound of Formula V



V

wherein:

R is an alkyl group;

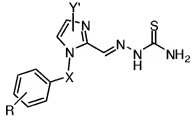
X is alkoxy; and

salts, prodrugs, or tautomers thereof.

95. (Previously Presented) The composition of claim 94 wherein R is methyl.

96. (Previously Presented) The composition of claim 94 wherein X is -OCH_2-; -OCH_2CH_2-; -CH_2O-; or -CH_2CH_2O-.

97. (Previously Presented) The composition of claim 2 wherein the thiosemicarbazone is a compound of Formula VI



VI

wherein:

X is absent or an alkylene;

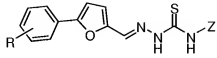
Y' is absent or is an alkyl group; and

R is a halogen; and

salts, prodrugs, or tautomers thereof.

98. (Previously Presented) The composition of claim 97 wherein X is -CH_2CH_2-; Y' is absent or is methyl, and R is Cl.

99. (Currently Amended) The composition of claim 2 wherein the thiosemicarbazone is a compound of Formula VII



VII

wherein:

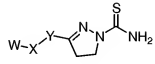
R is nitro and Z is H; or

R is Cl and Z is selected from the group consisting of alkyl, pyridylalkylene, piperidinylalkylene, morpholinylalkylene, and ~~piperizinylalkylene~~ piperazinylalkylene; and

salts, prodrugs, or tautomers thereof.

100. (currently amended) The composition of claim 99 wherein Z is methyl, pyridylmethylene, piperidinylethylene, morpholinylethylene, ~~piperizinylmethylene, piperizinylethylene~~ piperazinylmethylene, piperazinylethylene, and morpholinylbutylene.

101. (Previously Presented) The composition of claim 2 wherein the thiosemicarbazone is a compound of formula VIII and salts, prodrugs, or tautomers thereof:



VIII

wherein:

W is a phenyl, substituted phenyl, pyridinyl, or substituted pyridinyl group;

X is absent or is selected from the group consisting of oxo, amino, alkylene, and substituted alkylene; and

Y is an aryl or heteroaryl group.

102. (Currently Amended) The composition of claim 101 wherein Y is selected from the group consisting of phenyl, furanyl, ~~pyridinyl~~ pyridinyl, pyrrolyl, pyrazolyl, pyrazinyl, thiazolyl, and

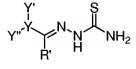
imidazolyl.

103. (Previously Presented) The composition of claim 101 wherein Y is furanyl.

104. (Previously Presented) The composition of claim 101 wherein X is absent.

105. (Previously Presented) The composition of claim 101 wherein W is substituted with at least one member selected from the group consisting of -Cl; -F; -Br; $-CF_3$; $-OCH_3$; $-NO_2$; $-CH_3$; $-N(CH_3)_2$; and $-OCF_3$.

106. (Previously Presented) The composition of claim 2 wherein the thiosemicarbazone is a compound of formula IX:



IX

wherein:

R' is H or lower alkyl;

Y is an aryl or heteroaryl group having one ring or two fused rings;

Y' is selected from the group consisting of halo, nitro, alkyl, substituted alkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, heterocyclyl, substituted heterocyclyl, amino, alkylamino, and dialkylamino; and

Y" is absent or is selected from the group consisting of halo, nitro, alkyl, substituted alkyl, heterocyclyl, substituted heterocyclyl, amino, alkylamino, and dialkylamino.

107. (Previously Presented) The composition of claim 106 wherein Y is selected from the group consisting of phenyl, furanyl, pyrrolyl, pyrazolyl, pyrazinyl, thiazolyl, and imidazolyl.

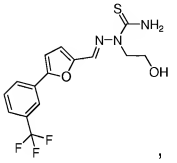
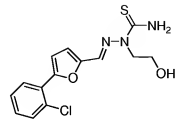
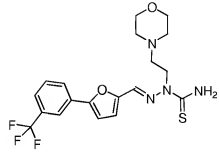
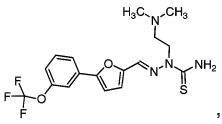
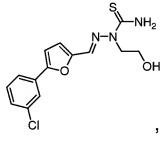
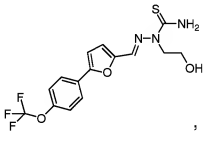
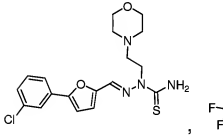
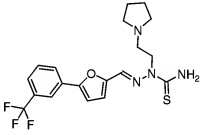
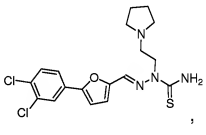
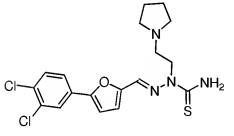
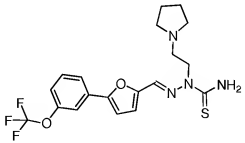
108. (Previously Presented) A composition comprising:

a vaccine in an amount effective to stimulate a cell-mediated immune response; and

a vaccine adjuvant comprising a thiosemicarbazone or a derivative thereof, in an amount effective to potentiate the cell-mediated immune response to the vaccine,

wherein the thiosemicarbazone is independently selected from Tables I, II, and III.

109. (Previously Presented) The composition of claim 108 wherein the thiosemicarbazone is selected from the group consisting of:


,

,

,

,

,

,

,

,

,

, and

.

110. (Previously Presented) The composition of claim 108 wherein the thiosemicarbazone is pyridine-2-carbaldehyde thiosemicarbazone or a pharmaceutically acceptable salt thereof.

111. (Withdrawn) A method of administering a vaccine comprising simultaneously administering a vaccine in an amount effective to stimulate a cell-mediated immune response; and

a vaccine adjuvant comprising a thiosemicarbazone or derivative thereof of claim 2 or 108, in an amount effective to potentiate the cell-mediated immune response to the vaccine.

112. (Withdrawn) A method of administering a vaccine comprising separately administering

a vaccine in an amount effective to stimulate a cell-mediated immune response; and

a vaccine adjuvant comprising a thiosemicarbazone or derivative thereof of claim 2 or 108, in an amount effective to potentiate the cell-mediated immune response to the vaccine

wherein said vaccine adjuvant is administered either prior to or subsequent to administration of the vaccine.